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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,176	11/27/2001	Evan R. Green	42390P10393	2243

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EXAMINER

WILLIAMS, HOWARD L

ART UNIT	PAPER NUMBER
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2819

DATE MAILED: 08/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/996,176

Applicant(s)

GREEN, EVAN R.

Examiner

Howard L. Williams

Art Unit

2819

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

*A person shall be entitled to a patent unless –  
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.*

Claims 6-21 are rejected under 35 U.S.C. 102(e) as anticipated by Sugar et al. (US 6,526,264 B2). Sugar et al. discloses a wideband multiple protocol wireless transceiver. With reference to figure 2 Sugar et al. disclose a transmit path (150; fig. 2; col. 3, lines 60-62) and a receive path (110; fig. 2; col. 3, lines 60-62). The transmitter path includes a digital-to-analog converter (DAC 158; fig. 2). The receiver path includes an analog-to-digital converter (ADC 116; fig. 2). A cancellation circuit (400; fig. 2) is coupled to receive digital data from the transmit path and the receive path and provide a signal matching but out of phase with the interference signal in the receiver so that the interference is cancelled by subtraction in summer 414. The summer is connected to the first antenna. Sugar et al. disclose the interfering nature of the "over the air standards" for Bluetooth and IEEE 802.11(b) which both operate in the unregulated 2.4 GHz ISM band. Bluetooth employing a frequency hopping protocol and IEEE 802.11(b) employs direct sequence PSK scheme. Sugar et al. also disclose the use of antenna polarization to additionally suppress transmit signal coupling into the receive path (col. 5, lines 6-8).

Regarding the newly inserted "directly coupled" portion of the claim language, Sugar discloses in column 5 that the transmit carrier suppressor 350, the predistorter 370, and linearizer 380 are optional elements. With the optional elements removed Sugar provides a direct connection to the DAC and picks off the signal directly coupled

to the DAC for processing in the path estimator processor (300) which corresponds to the applicant's "adaptive interference cancellation" block.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

Claims 6-9, 12-16 and 18-20 are rejected under 35 U.S.C. 103(a) as unpatentable over Hessel et al. (US 6,359,897 B1) in view of Lansford et al. (Wi-Fi (802.11b) and Bluetooth : Enabling Coexistence), Dankberg et al. (US 5,596,439), and Zehavi et al. (US 6,745,018).

Hessel et al. discloses a programmable radio which can operate among many different modulation schemes. Hessel et al. specifically disclose ASK, PSK and FSK schemes among others. Hessel et al. also discloses reprogramming the transmitter or receiver at any time (col. 10 lines 40-61) as well as multiple outputs. In figure 5 Hessel shows a transmit path arrangement and receive path arrangement including an ADC (129; fig. 5) in the receive path and a DAC (130; fig. 5) in the transmit path. Hessel et al. disclose separate transmit and receive antennas also (11; fig. 5). Hessel et al. does not disclose cancellation of interference.

Lansford et al. in the article Wi-Fi (802.11b) and Bluetooth : Enabling Coexistence discloses that interference would be expected between Bluetooth and IEEE 802.11b standards because of their overlapping operating frequencies. Bluetooth employs a frequency hopping scheme which carries it into the same portion of the ISM band that the 802.11b standard operates in. As a result and disclosed by Lansford et al. "This band coverage is the reason time-frequency collisions between Bluetooth and 802.11b are inevitable." (page 25 penultimate paragraph). Lansford in this section is discussing interference reduction techniques and gives a general list of areas. In the

area of physical layer or radio layer Lansford discloses that some collisions cannot be avoided unless PHY layer techniques are used. Continuing Lansford states, "For example, the 802.11b specification requires that an ACK be transmitted within a few microseconds after a packet is successfully received. If the same station is also transmitting a Bluetooth packet at that time, the node expecting the ACK may be jammed by the Bluetooth signal. Only by the use of signal processing techniques in the PHY layer can the Bluetooth signal be excised from the 802.11b passband so that the ACK can be successfully processed." While the relevant part of this disclosure was referenced in an earlier action the responses have cast this disclosure as limited to the ACK signal. The examiner does not agree. Lansford clearly states it as an example and the frequency hopping scheme of the Bluetooth signal colliding with an ACK signal would be coincidental and could just as well adversely affect other portions of an 802.11b signal.

Dankberg et al. discloses a system for overcoming self interference in a RF system. Dankberg discloses amplitude shift keying (col. 3, lines 41-43) and also states that other modulations can be used as well. With reference to figure 5 Dankberg et al. disclose the source information signal to be digital in nature (col. 3, lines 1-5). The transmit path (102, 104, 106) is drawn to show a modulator (102), transmitter (104) and antenna (106). The modulator is disclosed as converting the source information signal into a format suitable for transmission. Dankberg et al. previously disclosed the source information signal as digital in nature so it would be obvious that a digital to analog converter resides in the transmit path, figure 4 show a representative depiction of the transmitted signal S1 which is clearly a modulated analog signal. A portion of the source information signal from the input of the modulator (102) is shunted over to the interference canceller block shown in the receiver path. The receiver path is further depicted as including an antenna (108), receiver (110), the aforementioned canceller (112) and a demodulator (114). The demodulator block is disclosed as recovering the desired information signal from the signal representing the recovered signal S2'. Dankberg has disclosed the source information signal as digital in nature so the presence of an ADC would be presumed. Dankberg also discloses with regard to figure

7 the interference canceller may include delay (20) for correct time alignment with the received composite signal, modulator/mixer (22) which is stated as needing to replicate the function of the modulator if the source signal is stored in the form of the source information signal (col. 5, lines 1-4), programmable gain and subtraction circuit.

Zehavi et al. disclose active cancellation of interfering signals in wireless systems. In column 4, lines 14-28 that the cancellation signal can be generated in analog and/or digital circuitry in a variety of ways. In figure 6 Zehavi et al. disclose a direct coupling of the DAC input signal to the adaptive cancellation circuit.

It would have been obvious to one of ordinary skill in the art from the disclosures of Hessel et al., Lansford et al., Dankberg et al. and Zehavi et al. to modify the Hessel transceiver to provide interference cancellation as disclosed by Dankberg using the direct DAC input fed to active interference cancellation to mitigate self-interference in a multiple protocol transceiver such as disclosed by Hessel for the reasons stated by Lansford et al. to allow coexistence of multiple protocol such as Bluetooth and 802.11b which share a portion of the same frequency band because it would improve packet reception, prevent unnecessary packet retransmission should ACK signals be lost and fail to be recognized.

Claims 10, 11, 17 and 21 are rejected under 35 U.S.C. 103(a) as unpatentable over Hessel et al. (US 6,359,897 B1) in view of Lansford et al. (Wi-Fi (802.11b) and Bluetooth : Enabling Coexistence), Dankberg et al. (US 5,596,439), and Zehavi et al. (US 6,745,018) and further in view of Kensworthy (US 5,691,978). The combination of Hessel et al., Lansford et al. and Dankberg et al. was not seen to disclose orthogonal antenna placement to minimize interference. Kenworthy discloses in column 3, lines 4-16 various additional steps that can be taken with regard to the antennas and their physical placement and configuration to further minimize interference from the transmitted signal in the receive signal path. It would have been obvious to use orthogonal antenna placement to achieve additional interference reduction from self coupling because it would further improve the reception and recognition of the desired received signal.


Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Howard L. Williams at telephone number 571.272.1815. The Patent and Trademark Office has a new central facsimile number for application specific correspondence intended for entry, it is 571-273-8300.

11 August 2005  
Voice: (571) 272-1815

  
Howard L. Williams  
Primary Examiner  
Art Unit 2819